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10/711,477

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Liang A. Xue

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EXAMINER

WIESE, NOAH S

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/711,477	Applicant(s) XUE ET AL.	
	Examiner NOAH S. WIESE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 20-28 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 19 is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/04/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

1. The claims 1-28 are pending and presented for the examination.

Information Disclosure Statement (IDS)

2. The information disclosure statement (IDS) was submitted on 01/04/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

Election/Restrictions

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-19, drawn to glass composition, classified in class 501, subclass 1.
 - II. Claims 20-22, drawn to a fuel cell, classified in class 429, subclass 35.
 - III. Claims 23-28, drawn to a method of making a fuel cell, classified in class 65, subclass 17.1.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as combination and subcombination.

Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in

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other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the composition does not require the structures of the fuel cell. The subcombination has separate utility such as a sealant.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Inventions II and III are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the method can be used to make a product that does not require the first and second structures.

Inventions I and III are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different

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product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the method can be used to make a product that does not require a non-metal filler.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

- (a) the inventions have acquired a separate status in the art in view of their different classification;
- (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;
- (c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);
- (d) the prior art applicable to one invention would not likely be applicable to another invention;
- (e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

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The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Mr. Kevin King on 5/5/2008 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-28 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b)

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if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may**

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result in a loss of the right to rejoinder. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 2 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Sridharan et al (US 6124224).

Regarding **claims 2 and 12**, Sridharan teaches a sealant glass composition free from alkali metal oxides that is combined with a alumina or cordierite filler to form a sealant composition. The filler is present in amounts up to 15 wt% (see Example 1).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sridharan et al (US 6124224) in view of Chiba (US 6362119).

Regarding **claim 1**, Sridharan et al teaches glass compositions used for high temperature sealing operations. These glasses comprise all of the components of the glasses of instant claims in ranges that encompass the instant ranges (see claim 1 and column 3, lines 5-20), apart from the minor amount of ZnO. Through routine optimization and experimentation of the ranges taught by Sridharan, many different glass compositions can be construed that meet the limitations of claim 1. That routine optimization would lead one of ordinary skill to compositions meeting instant limitations is further supported by the fact that the Sridharan compositions are for the same applications as those of instant claims (as sealants), and thus routine optimization would be toward the same ends in terms of properties. Two examples are given below:

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Table 1 - Example 1 from Sridharan ranges

	Weight %	Mole %
<i>SiO₂</i>	20.00	29.62
<i>B₂O₃</i>	12.00	15.33
<i>Al₂O₃</i>	2.00	1.75
<i>MgO</i>	5.00	11.13
<i>CaO</i>	7.00	11.10
<i>BaO</i>	49.00	28.43
<i>ZrO₂</i>	2.00	1.46
<i>Y₂O₃</i>	3.00	1.18
<i>Total</i>	100.00	100.00

Table 2 - Example 2 from Sridharan ranges

	Weight %	Mole %
<i>SiO₂</i>	18.50	24.78
<i>B₂O₃</i>	6.00	6.93
<i>Al₂O₃</i>	3.00	2.37
<i>MgO</i>	14.00	28.18
<i>CaO</i>	8.00	11.48
<i>BaO</i>	45.50	23.88
<i>ZrO₂</i>	2.00	1.32
<i>Y₂O₃</i>	3.00	1.07
<i>Total</i>	100.00	100.00

As can be seen, these glasses fall well within the teachings of Sridharan and also meet the limitations of claim 1. Thus, a prima facie case of obviousness is made from the encompassing ranges taught by Sridharan. See MPEP 2144.05 (II). “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) “The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages.” Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382.

Though Sridharan does not teach the inclusion of small amounts of ZnO, this component is commonly included in glasses of the same type as those of Sridharan. Chiba teaches barium borosilicate glasses that are of similar composition to those taught by Sridharan. The patent teaches the use of minor amounts of ZnO as a fluxing agent to control the devitrification behavior of the glasses. This is a desirable feature for glasses used as sealants, and so one of

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ordinary skill would have been motivated to include small amounts of ZnO in the Sridharan glasses. One would have expected reasonable success in the modification because, as shown by the cited patents, the use of ZnO in glasses of the same type was well known in the art. Therefore, claim 1 is obvious and patentably indistinct over the prior art of record.

Regarding **claims 2-3**, as discussed above, Sridharan teaches a sealant glass composition wherein routine optimization would lead one to glass compositions meeting the compositional limitations of claim 3. Sridharan further teaches that the sealant glasses can be used in a sealant composition along with a filler (see column 4, lines 45-49).

Regarding **claim 4**, as can be seen from Table 1 above, glass compositions having a BaO content between 25 and 35 mol% can be construed from within the Sridharan ranges.

Regarding **claim 5**, as can be seen in Table 1 above, glass compositions having a Y_2O_3 content between 1 and 3 mol% can be construed from within the Sridharan ranges.

Regarding **claim 6**, as can be seen in Table 1 above, glass compositions having a B_2O_3 content between 14 and 18 mol% can be construed from within the Sridharan ranges.

Regarding **claim 7**, as can be seen in Table 2 above, glass compositions having a SiO_2 content between 15 and 25 mol% can be construed from within the Sridharan ranges.

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Regarding **claim 8**, as can be seen in Table 1 above, glass compositions having a MgO content between 10 and 20 mol% can be construed from within the Sridharan ranges.

Regarding **claim 9**, as can be seen in Table 1 above, glass compositions having a CaO content between 10 and 18 mol% can be construed from within the Sridharan ranges.

Regarding **claim 10**, as can be seen in Table 1 above, glass compositions having a ZrO₂ content between 1 and 2 mol% can be construed from within the Sridharan ranges. As discussed above, adding minor amounts of ZnO to glass compositions of the type taught by Sridharan would be obvious given the prior art of record. These minor amounts would fall within the range of 1 to 3 mol% through routine optimization.

Regarding **claims 11-12**, Sridharan teaches examples where the glass composition is combined with a filler to form a sealant composition. The filler is alumina (see column 4, lines 45-49).

Regarding **claim 13**, Sridharan teaches that the filler can be zirconia, but does not specifically teach that it is yttria-stabilized zirconia (see column 4, lines 5-8). However, the use of stabilized zirconia as a filler in these types of glasses was well known in the art at the time of the invention. The previously cited prior art Chiba (US 6362119) teaches a glass composition of the same type as that of Sridharan, and teaches that the composition can be combined with a filler that can be alumina or stabilized zirconia (see claim 6). This shows that alumina and stabilized zirconia were known to be equivalent fillers for this application, and the

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use of stabilized zirconia in the Sridharan compositions would be a matter of using an equivalent material in order to achieve expected and equivalent results. Therefore, the claim is obvious and not patentably distinct over the prior art of record.

Regarding **claim 17**, Sridharan does not teach that the glass component of the composite crystallizes when heated above its softening point. However, this devitrification property is an inherent property of the glass and sealant composition. Because, as shown above in Tables 1 and 2, Sridharan teaches sealant compositions comprising glasses that have equivalent compositions to those of instant claims and also have the same filler, it necessarily follows that these compositions would have crystallization of the glass component upon heating above the softening point. Therefore, this additional limitation is met by the teachings of the prior art cited above.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sridharan et al (US 6124224) in view of Chiba (US 6362119) and Koderá et al (US 2003/0216240).

Claim 14 differs from Sridharan in view of Chiba because while Sridharan and Chiba teach a composition comprising alkali-free glass and a yttria-stabilized zirconia filler, the use of barium titanate as a filler is not taught. However, barium titanate was known in the art to be an effective filler material in glass-filler compositions.

Koderá et al teaches a glass-filler composition comprising a glass component of a similar type to that of Sridharan, and a filler component that can

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be zirconia, alumina, cordierite, or barium titanate (see paragraph 0021). This shows that barium titanate was known to be a suitable and equivalent filler material to those taught by Sridharan and Chiba, and thus the use of barium titanate as a filler along with stabilized zirconia would have been a matter of using an equivalent filler for expected results. The specific combination of fillers used would depend on one's desired properties for the glass-filler composition. Thus, it is clear from the teachings of Sridharan in view of Chiba and Koderia that claim 14 is obvious and not patentably distinct over the prior art of record.

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sridharan et al (US 6124224) in view of Fabian et al (US 2003/0162883).

Regarding **claim 15**, the claim differs from Sridharan et al because Sridharan does not teach that a thermoplastic binder is included in the glass-filler composition. However, the use of a thermoplastic binder in these types of compositions was known in the art at the time the invention was filed.

Fabian et al teaches a sealant composition comprising a ceramic blend and a thermoplastic binder (see Abstract). One of ordinary skill would have been motivated to add the binder taught by Fabian to the Sridharan composition because Fabian teaches that the use of the binder allows the manipulation of the sealant composition for placement in the desired body (see paragraph 0003). This is desirable and would make the Sridharan composition more practically usable. One would have expected reasonable success in the modification because both Sridharan and Fabian teach sealant compositions comprising ceramic particulate, and thus no detrimental results would be expected.

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Therefore, claim 15 is obvious and not patentably distinct over the prior art of record.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sridharan et al (US 6124224) in view of Fabian et al (US 2003/0162883) and Pirooz (US 4365021).

Regarding **claim 16**, the claim differs from Sridharan et al because Sridharan does not teach that the sealant composition is in the form of a tape. However, this is a common configuration for the practical use of a sealant composition. Pirooz teaches a sealant glass composition used in particularly for joining ceramic components (see Abstract). This is the same purpose for which the Sridharan compositions are employed. Pirooz teaches that the sealant composition can be applied to substrates by any conventional technique, such as through the use of pyrolyzable or conventional tapes (see column 6, lines 25-28). Thus Pirooz shows that the tape configuration is a known in convention method for applying sealant compositions. This would have motivated one of ordinary skill to use this configuration with the Sridharan in view of Fabian compositions. Therefore, claim 16 is obvious and not patentably distinct over the prior art of record.

Allowable Subject Matter

12. Claims 18-19 are allowed. The prior art neither teaches nor suggests a composite sealant composition comprising a glass component meeting the range limitations of all nine components. A composition meeting all of the compositional

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limitations of claims 18-19 cannot be construed from the teachings of Sridharan et al, which is the closest prior art.

Conclusion

13. No claim is allowed.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

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Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

Noah Wiese
June 4th, 2008
AU 1793